metron

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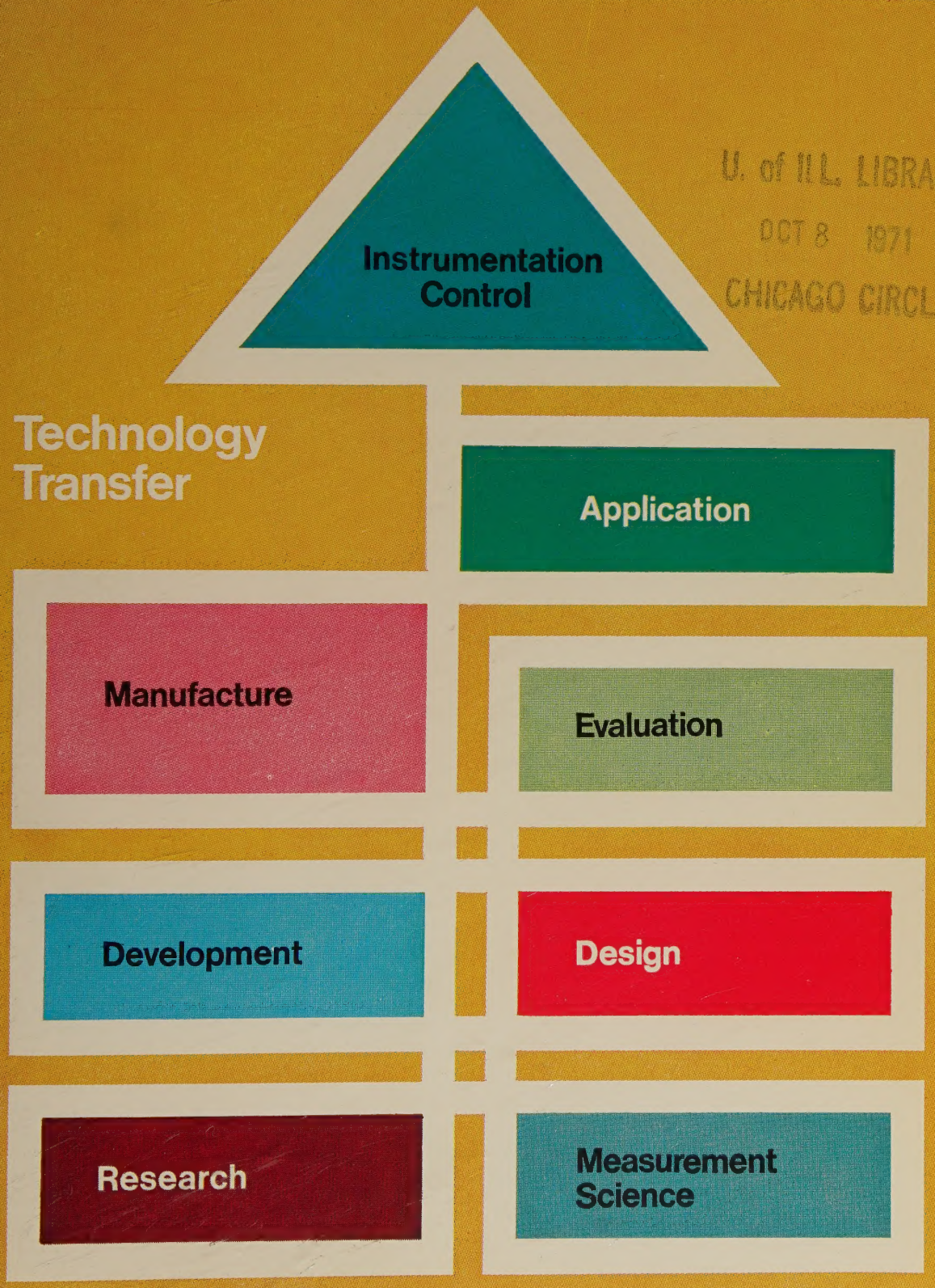
measurement control automation



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Metron

measurement control automation

Volume 2

1970

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Sira Institute

r & d centre for measurement, control and automation

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- ★ identifies new opportunities for economically beneficial use of industrial instrumentation and automation, promoting cooperative development by makers and users of equipment
- ★ provides research, development and information services
- ★ accelerates the transfer of technology from research to the widest possible application
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Automatic inspection, remote gauging and sensing
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Control system development
Process and production studies
Systems analysis and operations research
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Instrument evaluation
Materials for instruments
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Thin film deposition, photoresists and etching techniques
Ion-beam machining and polishing
Electron microscopy
Ion-selective electrodes
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Metron volume 2 1970

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List of articles

Critical reviews

Industrial colour control E COATES
R1 Jan pp 1–6

Instrumentation in oceanography C H CLAYSON
R2 Feb pp 41–47

Some technical problems affecting export of electrical equipment J E WARE
R3 Mar pp 83–87

Resistance strain gauges H K P NEUBERT
R4 Apr pp 123–130

Strain gauge adhesives J SHIELDS
R5 May pp 163–171

Solid state transducers for instrumentation G M HATOYAMA
R6 Jul pp 237–242

Some trends in the development of automatic inspection and testing S S CARLISLE *and* A R BUGDEN
R7 Aug pp 273–290

Measurement and control in agriculture J R STANSFIELD
R8 Sep pp 321–325

Ergonomics in instrument design D WHITFIELD
R9 Oct pp 361–368

Ion-selective electrodes R J SIMPSON
R10 Dec pp 427–432

Information reviews

Design and construction of instruments
N1 Jan pp 7–14; **N7** Mar pp 89–93; **N13** May pp 173–178; **N19** Jul pp 243–248; **N25** Sep pp 333–338; **N31** Nov pp 397–402

Performance of instruments
N4 Feb pp 49–54; **N22** Aug pp 291–299

Data handling
N10 Apr pp 131–135; **N16** Jun pp 205–209; **N28** Oct pp 371–376; **N34** Dec pp 433–438

Optical parameter measurement
N15 May pp 185–191; **N32** Nov pp 403–410

Thermal parameter measurement
N2 Jan pp 14–20; **N14** May pp 179–184; **N26** Sep pp 339–344

Mechanical parameter measurement
N5 Feb pp 55–63; **N17** Jun pp 210–219; **N29** Oct pp 377–384

Fluid mechanical parameter measurement
N8 Mar pp 94–99; **N20** Jul pp 249–253; **N33** Nov pp 411–415

Chemical parameter measurement
N11 Apr pp 136–144; **N23** Aug pp 300–309; **N35** Dec pp 439–447

Inspection and non-destructive testing
N12 Apr pp 145–150; **N30** Oct pp 385–388

Applications of measurement and control in industry
N6 Feb pp 64–69; **N18** Jun pp 220–223; **N24** Sep pp 327–332

Instrumentation in medicine and biology
N9 Mar pp 100–109; **N27** Sep pp 345–351

Applications of instrumentation in the natural environment
N3 Jan pp 20–25; **N21** Jul pp 254–258

Conference report

Applications of holography: international symposium (Besançon, 6–11 July 1970)
Oct p 369

List of journals

his list includes journals which have been scanned for the greater part of 1970.

Where the journal title includes the name of a society or institution, this appears first in capitals, followed by 'Journal', 'Transactions', etc, lower case.

he nationality of the journal is indicated after the journal title. (The nationality does not necessarily denote the language in which articles re written.)

COUSTICAL SOCIETY OF AMERICA Journal *USA*
dhesives Age *USA*
dvances in Electronics and Electron Physics *USA*
EG–Telefunken Progress *West Germany*
MERICAN CERAMIC SOCIETY Bulletin *USA*
MERICAN CERAMIC SOCIETY Journal *USA*
merican Journal of Physics *USA*
MERICAN SOCIETY OF MECHANICAL ENGINEERS
Transactions *USA*
B—Journal of Engineering for Industry
D—Journal of Basic Engineering
E—Journal of Applied Mechanics
nalyst (London) *UK*
nalytical Chemistry *USA*
pplied Economics *UK*
pplied Mechanics Reviews *USA*
pplied Optics *USA*
pplied Physics *UK*
pplied Physics Letters *USA*
pplied Spectroscopy *USA*
tom (London) *UK*
tti della Fondazione Giorgio Ronchi *Italy*
ustralian Journal of Physics *Australia*
utomatica *UK*
utomation (London) *UK*
utomatisme *France*

attelle Research Outlook *USA*
CURA Bulletin *UK*
ell Laboratories Record *USA*
ell System Technical Journal *USA*
io-Medical Engineering *UK*
ritish Journal of Photography *UK*
ritish Plastics *UK*
RITISH STANDARDS INSTITUTION News *UK*
rown Boveri Review *Switzerland*
rüel and Kjaer Technical Review *Denmark*

anadian Journal of Physics *Canada*
hemical Processing (London) *UK*
HEMICAL SOCIETY Quarterly Reviews *UK*
hemistry and Industry (London) *UK*
omponent Technology *UK*
omputer Journal *UK*
omputers and Automation *USA*
ontrol Engineering *USA*
ontrol and Instrumentation *UK*
ontrol and Science Record *UK*
SIR Technical Information for Industry *South Africa*
SIRO Industrial Research News *Australia*
zechoslovak Journal of Physics *Czechoslovakia*

ata Systems *USA*
awe Digest *UK*
esign (London) *UK*
esign and Components in Engineering *UK*
esign Electronics *UK*
esign Engineering Materials and Components *UK*

ectrical Communication *USA*
ectrical Equipment *UK*
LECTROCHEMICAL SOCIETY Journal *USA*
ectronic Components *UK*
ectronic Design *USA*
Electronic Engineer *USA*
Electronic Engineering *UK*
Electronic Equipment News *UK*
Electronics *USA*
Electronics Letters *UK*
Electronics and Power *UK*
Electronics Weekly *UK*
Endeavour *UK*
Engelhard Industries Technical Bulletin *USA*
Engineer (London) *UK*
Engineering (London) *UK*
Engineering Production *UK*
Engineering Materials and Design *UK*
Engineers' Digest (London) *UK*
Environmental Engineering *UK*

Feingerätetechnik *East Germany*
Fluidics Feedback *UK*
Fluid Power International *UK*
Futures *UK*

GEC–AEI Journal of Science and Technology *UK*
General Physics *UK*
General Radio Experimenter *USA*
Glass Industry *USA*
Glass Technology *UK*
Glastechnische Berichte *West Germany*

Harvard Business Review *USA*
Hewlett–Packard Journal *USA*

IBM Journal of Research and Development *USA*
Industrial and Commercial Photographer *UK*
Industrial Diamond Review *UK*
Industrial and Engineering Chemistry *USA*
Industrial and Engineering Chemistry (Fundamentals) *USA*
Industrial and Engineering Chemistry (Process Design and Development) *USA*
Industrial and Engineering Chemistry (Product Research and Development) *USA*
Industrial Marketing *USA*
Industrial Process Heating *UK*
Industrial Research *USA*
Infrared Physics *UK*
INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE) Proceedings *USA*
INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE) Spectrum *USA*
INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE) Transactions *USA*
BME—Bio-medical Engineering
ED—Electron Devices
GE—Geoscience Electronics
IECI—Industrial Electronics and Control Instrumentation
IGA—Industry and General Applications
IM—Instrumentation and Measurement
SU—Sonics and Ultrasonics
INSTITUTION OF ELECTRICAL ENGINEERS (IEE) Journal *UK*
INSTITUTION OF ELECTRICAL ENGINEERS Proceedings *UK*
INSTITUTION OF ELECTRICAL ENGINEERS (IEE) Reviews *UK*
Instrumentation Technology *USA*
Instrument and Control Engineering *UK*

Instrument Practice *UK*
Instruments and Control Systems *USA*
Instruments et Laboratoires *France*
Instruments India *India*
INSTRUMENT SOCIETY OF AMERICA Transactions *USA*
International Biodeterioration Bulletin *UK*
International Electronics *USA*
IRON AND STEEL INSTITUTE Journal *UK*

Japanese Journal of Applied Physics *Japan*
Jemna Mechanika a Optika *Czechoslovakia*
Jena Review *East Germany*
Journal of Applied Mechanics *USA*
Journal of Applied Physics *USA*
Journal of Basic Engineering *USA*
Journal of Chemical Education *USA*
Journal of Electron Microscopy (Japan) *Japan*
Journal of Engineering for Industry *USA*
Journal of Marketing Research *USA*
Journal of Materials *USA*
Journal of Mechanical Laboratory of Japan *Japan*
Journal of Mechanical Laboratory Tokyo *Japan*
Journal of Photographic Science *UK*
Journal of Physics *UK*
A—General Physics
C—Solid State Physics
D—Applied Physics (*formerly* British Journal of Applied Physics)
E—Scientific Instruments (*formerly* Journal of Scientific Instruments)
Journal of Strain Analysis *UK*
Journal of Vacuum Science and Technology *USA*

Laboratory Equipment Digest *UK*
Laboratory Practice *UK*
Le Vide *France*
Leeds and Northrup Technical Journal *USA*
Light Production Engineering *UK*
Long Range Planning *UK*

Machine Design *USA*
Machine Design and Control *UK*
Machinery (London) *UK*
Machine Shop *UK*
Management Science *USA*
Manufacturing Optics International *UK*
Marconi Instrumentation *UK*
Marconi Review *UK*
Materials Engineering *USA*
Materials Evaluation *USA*
Materials Research and Standards *USA*
Materials Science and Engineering *Switzerland*
Measurement and Control *UK*
Mechanical Engineering *USA*
Medical and Biological Engineering *UK*
Mérés és Automatika *Hungary*
Messtechnik *West Germany*
Mesures Régulation Automatisme *France*
Metrologia *Canada*
Metrologia Aplicata *Romania*
Microelectronics *UK*
Microelectronics and Reliability *UK*
Microscope *UK*
Microtecnic *Switzerland*
Modern Plastics *USA*
Mullard Technical Communications *UK*

NATIONAL BUREAU OF STANDARDS Journal of Research *USA*
A—Physics and Chemistry
NATIONAL BUREAU OF STANDARDS Technical News Bulletin *USA*
NATIONAL INSTITUTE Economic Review *UK*
NATIONAL RESEARCH COUNCIL OF CANADA: MECHANICAL ENGINEERING DIVISION AND NATIONAL AERONAUTICAL ESTABLISHMENT Quarterly Bulletin *Canada*

NATIONAL RESEARCH COUNCIL OF CANADA: RADIO AN
ELECTRICAL ENGINEERING DIVISION Bulletin *Canada*
Nature (London) *UK*
New Scientist (London) *UK*
Non-Destructive Testing *UK*

Onde Electrique *France*
Operations Research *USA*
Optica Acta *UK*
OPTICAL SOCIETY OF AMERICA Journal *USA*
Optical Spectra *USA*
Optics and Spectroscopy (*translation of* Optika i Spektroskopiya) *USSR*
Optics (and Laser) Technology *UK*
Optik (Stuttgart) *West Germany*
Opto Electronics *UK*
Orbit *Switzerland*

Pattern Recognition *UK*
Philips Research Reports *Netherlands*
Philips Technical Review *Netherlands*
Philips Telecommunication Review *Netherlands*
Photographic Journal *UK*
Physics Bulletin *UK*
Physics and Chemistry *USA*
Plastics in Engineering *UK*
Plastics and Rubber Weekly *UK*
Plating *USA*
Platinum Metals Review *UK*
Pomiary Automatyka Kontrola *Poland*
Process Engineering Plant and Control *UK*
Product Design Engineering *UK*
Product Engineering *USA*

Radio and Electronic Engineer *UK*
RCA Review *USA*
Reports on Progress in Physics *UK*
Research/Development *USA*
Review of Physics in Technology *UK*
Review of Scientific Instruments *USA*
Revue MBLE (Manufacture Belge de Lampes et de Matériel Electronique) *Belgium*
Ricerca Scientifica (Roma) *Italy*
RRE Newsletter and Research Review *UK*

Science Journal *UK*
Scientiae *South Africa*
Scientific American *USA*
Scientific Instruments *UK*
SOCIETY FOR ANALYTICAL CHEMISTRY Proceedings *UK*
SOCIETY OF MOTION PICTURE AND TELEVISION ENGINEE
Journal *USA*
Solid-State Electronics *UK*
Solid State Physics *UK*
Solid-State Technology *USA*
Soviet Journal of Optical Technology (*translation of* Optiko-Mekhanicheskaya Promyshlennost) *USSR*
Sperry Rand Engineering Review *USA*
Strain *UK*
Systems Technology *UK*

Technometrics *USA*
Thin Solid Films *Netherlands*

Ultrasonics *UK*

Vacuum *UK*
Vide *France*
Visual *UK*

Wireless World *UK*

Zeiss Information *West Germany*

Guide to the indexes

Material indexed in the subject and author indexes to volume 2 1970 on pages 466 and 508 consists of the critical reviews, references cited in the information reviews, and the current titles.

After the entries in the indexes,

R numbers are critical review numbers

N numbers are information review numbers

Numbers following a stroke are reference numbers within an information review (eg *N35/105* denotes information review 35, reference 105)

Simple numbers are current title numbers

The monthly location of the critical reviews, information reviews, and current titles of volume 2 1970 is as follows:

Metron issue	Critical review	Last information review	Last current title
January	R1	N3	260
February	R2	N6	474
March	R3	N9	696
April	R4	N12	909
May	R5	N15	1111
June	—	N18	1359
July	R6	N21	1606
August	R7	N23	1854
September	R8	N27	2060
October	R9	N30	2255
November	—	N33	2469
December	R10	N35	2743

Subject index headings under which to search may be chosen from the *Subject index headings list* on page 462.

Subject index headings list

This list is intended to assist in the selection of headings under which to search the subject index. The list has the following sections:

1 Management and marketing, 2 Design, 3 Construction and manufacture, 4 Performance and standards, 5 Measurement science

Parameter measurement 6 Electrical, magnetic, time, 7 Thermal, 8 Optical, 9 Nuclear, 10 Acoustical, 11 Mechanical (including non-destruc testing and inspection), 12 Fluid mechanical, 13 Chemical

14 Data handling

Applications 15 Industry, 16 Medicine and biology, 17 Natural environment

1 Management and marketing

Management
Planning
Technology
Research

Conferences
(Symposia *see* Conferences)
Education

Specifications
Data
(Technological forecasting *see* Management, Technology)
Marketing
Exhibitions
Instruments
Instrumentation
Design
Ergonomics
(Sales *see* Marketing)

2 Design

general concepts

Design
Ergonomics
Display(s)
Data display

Maintenance
Reliability
Safety
Noise

electrical
(*see also* section 6)

Electrical
Electronic
Circuits
Microcircuits
Microelectronics
Signals
Safety
Noise: electrical
Cooling

Electro-optical
Dielectric
Hall effect

Components: electrical
Electronic components
Electrical contacts
Electrodes
Semiconductor devices
Amplifiers
Bridges
Ammeters
Voltmeters
Sources: electrical
Power supplies
(Cells: electrical *see* Sources: electrical)

mechanical

Components: mechanical (mountings, pivots, platforms, gyrostabilisers, seals, etc)
Bearings
Gears *see also* Components: mechanical
Motors *see also* Components: mechanical

control systems

Control system components
Controllers
Fluidics devices
Alarms
Timers
Switches

optical
(*see also* section 8)

Optical
Optical systems
Light
Infrared
Ultraviolet
Light modulation
Electro-optical
Fibre optics
Holography
Photography
Images
Interferometers
Monochromators
Spectrometers
Telescopes
Cameras

Optical components (mirrors, lenses, prisms, filters, windows, graticules, shutters, modulators, etc)
Mirrors *see also* Optical components
Lenses *see also* Optical components
Diffraction gratings *see also* Optical components
Optical materials
Glasses *see also* Optical materials
Ceramics
Crystals
Phosphors
(Photochromic *see* Optical materials)
(Cements *see* Optical materials, Adhesives)

Lamps
Lasers
(Light detectors *see* Photodetectors)
Light sources
Photodetectors
Photomultipliers
Infrared detectors
Ultraviolet detectors
Ultraviolet sources
Image tubes
Image converters
Semiconductor devices
(Transistors *see* Semiconductor devices)
(Vidicons *see* Image tubes)

3 Construction and manufacture

materials

Adhesives
(Cements *see* Adhesives, Optical materials)
Ceramics *see also* Materials
Coatings
(Elastomers *see* Plastics)
Glasses
Lubricants
Materials
Metals *see also* Materials
Paints
Plastics
Polymers
Rubbers
Semiconductors
Thin films

techniques

Assembly
Bonding
Cleaning
Cutting
Grinding
Inspection
Lubrication
Machining
Materials handling
Materials testing
Polishing
Testing
Welding

processes

Corrosion
Environmental testing

objects

Surfaces
Seals
Welds
Joints

Clean rooms
Environments
Automation
Manufacture

4 Performance and standards

Measurement
Calibration
Inspection
Quality control
Tensile testing
Testing
Standards
Standard specifications
Specifications
Units

Accuracy
Reliability
Safety
(Failure *see* Reliability)
Response
Transfer function

Instruments
Optical instruments
Maintenance

Environments
Environmental testing
Humidity

5 Measurement science
(*see also* sections 2, 4)

Measurement
Control
Automation
Testing
Inspection
Detectors
Units
Data
Planning
Research
Technology
Management
Conferences
Exhibitions
Bibliographies
Analysis
Analyzers
Components
Instruments
Instrumentation
Control systems
Transducers

effects

Dielectric
Electro-optical
Faraday
Hall
(Kerr *see* Electro-optical)
Josephson
(Mössbauer *see* Spectrosco
Piezoelectric
Seebeck
Thermoelectric

Optics
Optical
Light
Acoustics

itrasonics
ectrical
ectronic
agnetic
hermal
echanical
uclear
hase
ressure
ltraviolet
-ray

ARAMETER IEASUREMENT

Electrical, magnetic, time

arameters

apacitance
urrent
urrent measurement
ielectric constant
lectric charge
lectrical conductivity
lectrical (measurements)
requency
all effect
Hysteresis *see* Magnetic properties)
mpedance
nductance
nterference
oss
lagnetic field
lagnetic properties
lagneto-optical
lagnetic
oise
Permittivity *see* Dielectric constant)
hase: angle
hase: electrical
otential
ower measurement
esistance
esistivity
uperconductivity
ignals
ime
oltage

struments

mmeters
ridges
locks
orrelators
lectrometers
alvanometers
otentiometers
emiconductor devices
mers
hermistors
ransformers
ransistors *see* Semiconductor devices)
oltmeters

Thermal

rameters

mperature measurement
mperature control
mperature scale(s)
ermography
hermal radiation
ermal properties
Thermal conductivity
Thermal expansion
Radiometry
Absorption

Thermoelectric
Seebeck
Infrared
Heat
Heat flux
Heat transfer
Emissivity

Calorimetry
Flames
Freezing point
Thermoluminescence

instruments and transducers

Thermometers
(Pyrometers *see* Thermometers)
Temperature transducers
Thermocouples
Thermistors
(Thermostats *see* Temperature control)
Radiometers
Calorimeters
Coulometers
Cryostats
Dilatometers
Bolometers *see also* Radiation detectors
Radiation detectors
Infrared detectors
Heaters

8 Optical

(*see also* section 2)

parameters

Birefringence
Colour
Diffraction
Electroluminescence
Electro-optical
Faraday effect
Frequency
Interference: optical
(Kerr effect *see* Electro-optical effects)
Light
Luminescence
Magneto-optical
Optical
Optical modulation
Polarization
Reflectance
Reflectivity
Refractive index
Resolution
(Scattering *see* Light)
Thermoluminescence
Transfer function

instruments and techniques

Cameras
Colorimeters
Colorimetry
Colour measurement
Densitometers
Densitometry
Exposure meters
Fluorimeters
Frequency meters
Lasers
Holography
Image detectors
Interferometers
Interferometry
Light modulators
Light modulation
Microscopes
Microscopy
Optometers
Photography *see also* Emulsions
Photometers
Photometry
Polarimeters
Polarimetry
Reflectometers
Reflectometry
Refractometers
Spectrometers
Spectrometry
Spectrophotometers
Spectrophotometry
Spectroscopes
Spectroscopy
Telescopes

objects of measurement

Optical components
Optical materials

Lamps
Light sources
Lasers
Photodetectors

Image(s)
Interference fringes
Spectra

9 Nuclear

Bubble chambers
Dosimetry
Electrons
Ions
Isotopes
(Neutrons *see* Nuclear particles)
Nuclear
(Nuclear counters *see* Nuclear detectors)
Nuclear detectors
Nuclear magnetic resonance
Nuclear particles
Nuclear radiation
Nuclear reactors
Nuclear spectrometers
Protons
Radioactive isotopes
Radioactivity
X-rays

10 Acoustical

Acoustic(s)
Ultrasonics
(Sound *see* Acoustics)
Non-destructive testing: ultrasonic
Noise: acoustical
Materials
Transducers
Microphones
Piezoelectric

11 Mechanical

parameters

Alignment
Angle
Area
Attitude
Density
Diameter
Direction
Displacement
Distance
(Gauging *see* Linear dimensions)
Length
Linear dimensions
Mass
Position
Profile
Range
Roundness *see also* Linear dimensions
Shape
Thickness
(Tilt *see* Angle)
Volume
(Width *see* Linear dimensions)

Acceleration
Energy
Force
Load: mechanical
Movement
Power
Shock
Speed
Strain
Stress
Tension
Torque
Torsion
Velocity
Vibration

Abrasion
Adhesion
Bonding
Cracks
Creep
(Damping *see* Mechanical properties)
Deformation
Elasticity
Fatigue
Flatness
(Flaws *see* Inspection, Non-destructive testing)
Fracture
Friction
Hardness
Mechanical properties
Photoelasticity
Slip
Surface roughness
Wear

Non-destructive testing
Impact testing
Inspection
Stress analysis
Fatigue testing
Hardness testing
Tensile testing
Vibration testing

Guidance
Navigation
Ellipsometry
Interferometry
Laser applications
Testing
Weighing

instruments

Accelerometers
Altimeters

Balances
Ellipsometers
Extensometers
Goniometers
Gyroscopes
Interferometers
Load cells
Pendulums
Rangefinders
Strain gauges
Stroboscopes
Tachometers

12 Fluid mechanical

parameters

Flow
Flow control
Flow measurement
Flow visualization

Consistency
Density
Evaporation
Level
Level measurement
Pressure
Pressure measurement
Surface tension
Vacuum
Vapour pressure
Viscosity
Viscoelasticity
Volume

instruments

Anemometers
(Barometers *see* Pressure gauges)
Flowmeters
Fluidics devices
Leak detectors
(Manometers *see* Pressure gauges)
Mass spectrometers
Nephelometers
Pressure gauges
Pressure transducers
Rheometers
Turbidimeters
Turbidistats
Vacuum gauges
Vacuum systems
Viscometers

objects

Fluids
Liquids
Gas(es)
Vapours
Plastics
Polymers

Air
Aerosols
Wind
Leaks

13 Chemical

techniques

Analysis: chemical
Analysis: gas
Chemistry
Calorimetry
Chromatography
Chromatography: gas
Colorimetry
Combustion
Electron microscopy
Electron probe analysis
Electron spin resonance
Electrophoresis
Humidity
Moisture
Mass spectrometry
Nuclear magnetic resonance
Molecular weight
pH
Particle size measurement
Polarography
Potentiometry
Refractometry
Sampling
Spectrometry
Spectrophotometry
Spectroscopy
Titrimetry
X-ray analysis
X-ray diffraction
X-ray diffractometry
X-ray spectroscopy

Absorption
Adsorption
Chemical composition
Phase
Porosity

(for other techniques *see* Analysis: chemical)

instruments

Analyzers
Analyzers: chemical
Analyzers: gas
Balances
Calorimeters
Centrifuges
Chromatography: gas, detectors
Colorimeters
Electrodes
Electron microscopes
Electron probe analyzers
Electron spin resonance spectrometers
Electron spectrometers
Flame photometers
Fluorimeters
Hygrometers
Ion probe microanalyzers
Microscopes
Mass spectrometers
Nuclear magnetic resonance spectrometers
Nuclear resonance spectrometers
Osmometers
Polarimeters
Reflectometers
Refractometers
Spectrometers
Spectrophotometers
Turbidimeters
Turbidistats
Ultracentrifuges
X-ray cameras
X-ray diffractometers
X-ray spectrometers

(for other instruments *see* Analyzers: chemical)

objects

Aerosols
Dust
Effluents
Pollution

Environments
Air
Atmosphere
Laboratories

14 Data handling

Data acquisition
Data display
Data handling
Data processing
Data recording
Data storage
Data transmission
Displays
Recording

Character(s)
Character recognition
Pattern recognition
(Optical character recognition *see* Character recognition)
Codes
Signals
Television
Telemetry
Telecommunications
Communications
Communication: optical
Light modulation
Holography
Photography
Emulsions
Image(s)

Computer(s)
Counters
Converters
Encoders
Image converters
Image detectors
Image tubes
Plotters
Pulse(s)
Recorders
(Resolvers *see* Converters)

Cathode ray oscilloscopes
Cathode ray tubes
Cameras: television
Cameras
Light modulators
Oscilloscopes
Panels
Projectors
Sensors

Scales (instrument)

Optical components

APPLICATIONS

15 Industry

(*see also* specific parameter measurements)

general concepts

Automation
Control
Control systems (*also subdivisions:* chemical, food, metal and paper industries, power engineering, transport)
Process control
Quality control
Computer control
Computer(s)
Instrumentation (*also subdivisions:* chemical, foo iron and steel, paper and textile industries, power engineering)
Inspection
Testing

application fields

Food
Paints
Plastics
Rubbers
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rr-Smith M W *1107, N21/23*
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mball C *1932* (journal is *Analytical Chemistry*)
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